APPENDIX A- Cover Sheet

SOUTHEAST TENNESSEE DEVELOPMENT DISTRICT

2016 Labor Education Alignment Program (LEAP 2.0)

Advanced Manufacturing Skills and Internship Program (AMSIP)

Southeast Tennessee Development District

IN PARTNERSHIP WITH

1. Chattanooga State Community College

2. Marion County School District, Hamilton County Department of Education, and Bledsoe County School District

3. Wacker, Jasper Materials, Valmont, & Lodge Manufacturing

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Funding requested:

$ 956,809

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Abstract

In southeast Tennessee, skills shortages and a low labor market supply are a major threat to strong performance in manufacturing and, if not addressed, can potentially thwart the trend of steady manufacturing growth. Local data mirror national data: local employers report a shortage of skills associated with mechatronics, industrial maintenance, machining and welding. In January 2016, Volkswagen reaffirmed its expansion to produce a new SUV in Hamilton County. The $900 million investment will create 2,000 new direct jobs, and 3,600 additional jobs will be added by other businesses/suppliers.[1] Wacker Chemie AG officially opened its plant on April 18, 2016 and is trying to fill a total of 650 positions for production of hyperpure polysilicon used in photovoltaics.[2] Wacker's press release also states that there are plans to expand at the Charleston, TN site to produce pyrogenic silica which will further increase the demand for skilled labor. VW and Wacker are only two examples of the many manufacturers in the region that are currently expanding or preparing to expand which is straining the labor supply in the southeast Tennessee region.

In order to address skills gaps and a weak labor supply pipeline, Chattanooga State Community College, K-12 school districts in Hamilton, Marion and Bledsoe Counties, CTE Directors, Southeast Tennessee Development District, and regional employers propose AMSIP and are requesting $956,809 to launch the project. The project will expand dual enrollment and dual credit courses in eight high schools in three counties, address negative perceptions of manufacturing, in part, via strategic outreach and through 48 high school teachers' externships, hire one full-time Program Manager and one part-time Outreach Coordinator, align with the *Drive to 55* initiative to increase attained credentials, expand the in-demand skilled workforce pipeline, and focus on employer-identified in-demand skill sets with mechatronics, industrial maintenance, machining and welding training, in part, through the purchase of much needed equipment. The equipment will allow students to experience the mechanical and electrical processes as well as develop the skills needed to problem-solve in an environment that mirrors postsecondary training as well as the workplace. The program will also include annual Advanced Manufacturing Academies for high school graduates, Junior Academies for 7-10 grade students, and employer-paid scholarships and internships with concomitant academic credit for high school graduates who successfully complete the internship.

If funded, AMSIP will positively impact the advanced manufacturing workforce pipeline and provide employers with the relevant talent they need. Sustainability is supported, in part, through strong relations with industry partners and by Tennessee Promise and other scholarship programs which can pay for dual enrollment and dual credit as well as college tuition for two years. Educator partners will ensure continuation of dual enrollments and credits; and K-12, postsecondary, workforce development and economic development professionals among others will remain market-responsive to workforce supply/demand through consistent communication with industry partners.

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[1] Sources: Chattanooga Area Chamber of Commerce and http://www.timesfreepress.com/news/2014/jul/14/vw-announce-new-suv-today-chattanooga

[2] http://www.wacker.com/cms/en/press_media/press-releases/pressinformation-detail_68608.jsp

Advanced Manufacturing Skills and Internship Program (AMSIP)

Demonstrated Need: In southeast Tennessee, skills shortages and a low labor market supply are a major threat to strong performance in manufacturing and, if not addressed, can potentially thwart the trend of steady advanced manufacturing (AM) growth. On a national level, over 75% of manufacturers report a moderate to severe shortage of skilled workers and over 80% of manufacturers report a moderate to severe shortage in highly skilled labor supply.[1]

Nationally, manufacturers have reported a significant gap between the talent they need and what they can actually find. Shortages in skilled production jobs – machinists, operators, maintenance technicians, welders, and more – are taking their toll on manufacturers' ability to expand, innovate and improve productivity. Workforce shortages or skills deficiencies in skilled production roles and production support have been reported by 74% of manufacturers nationwide. These jobs require the most training, and are traditionally among the hardest manufacturing jobs to fill. Additionally, low unemployment does not make it easier to fill positions, particularly in the areas of skilled production and production support. As of May 2016, Labor Force Estimates for Chattanooga and Cleveland MSAs, the two leading AM areas in the southeast, show that the unemployment rates are at 4 % and 3.7 % respectively.[2]

According to a ManPowerGroup survey, 38 percent of *all* employers experienced difficulty filling job openings in 2015, the highest number since 2007.[3] Searching for talent and hiring in a tight labor market is not easy, and recruitment challenges become more pronounced for positions requiring higher skill levels. The impact of skills gaps on organizations is clear: it decreases the

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[1] http://www.themanufacturinginstitute.org/Research/Skills-and-Training-Study/~/media/70965D0C4A944329894C96E0316DF336.ashx

[2] https://www.jobs4tn.gov/vosnet/analyzer/results.aspx?session=labforce

[3] http://manpowergroup.com/wps/wcm/connect/db23c560-08b6-485f-9bf6-f5f38a43c76a/2015_Talent_Shortage_Survey_US-lo_res.pdf?MOD=AJPERES

capacity to innovate and maintain levels of productivity. In general, companies expect the skilled production group to be the hardest to find in the job market.[4] Local data mirror national data—local employers report a critical shortage of skills associated with mechatronics, industrial maintenance, machining and welding.

Recruiting, training and sustaining a skilled AM workforce in southeast Tennessee remains a serious challenge. In January 2016, Volkswagen (VW) reaffirmed its expansion and production of a new SUV which will commence in late 2016. The $900 million VW investment will create 2,000 new direct jobs, and 3,600 additional jobs will be added by other businesses such as Tier 1 – 3 suppliers.[5] On July 20, 2016, VW confirmed that it plans to hire "about 25 people weekly over the next couple of months and 700 more employees by year's end."[6] Wacker Chemie AG officially opened its plant on April 18, 2016 and is trying to fill a total of 650 positions for production of hyperpure polysilicon in the use of photovoltaics.[7] Wacker's press release also states that there are plans to expand at the Charleston, TN site to produce pyrogenic silica which will further increase the demand for skilled labor. VW and Wacker are only two examples of the many manufacturing businesses in the region that are currently expanding or preparing to expand which is adding to the labor supply problem for the southeast Tennessee region.

In general, manufacturers are also increasing the deployment of process automation and other technologies making it harder for both existing and new employees to keep up. In short, the

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[4] http://www.themanufacturinginstitute.org/Research/Skills-and-Training-Study/~/media/70965D0C4A944329894C96E0316DF336.ashx

[5] http://www.timesfreepress.com/news/business/aroundregion/story/2016/jan/11/vw-committed-chattanooga-plant-expansion-suv-officials-say/344048

[6] http://www.timesfreepress.com/news/business/aroundregion/story/2016/jul/20/vw-looks-fill-chattanoogplant-new-production/376854

[7] http://www.wacker.com/cms/en/press_media/press-releases/pressinformation-detail_68608.jsp

industry's technological advances are rapidly changing the nature of work.[8] Locally, Lodge Manufacturing in Marion County recently installed new automated processes which required existing employees to obtain new skills and raises the skills expectations for its future workforce.

More recently, Lodge announced that it is adding jobs after a $90 million expansion of its existing facility. On Wednesday, June 29, 2016 the nation's biggest maker of cast-iron skillets and other goods broke ground on its largest-ever expansion.[9] The expansion includes a new 127,000 square-foot foundry that will boost manufacturing capacity by 75 percent and meet demand for its popular cookware. Also, the business is constructing a 212,000 square-foot distribution center nearby, which will be the biggest building in Marion County and capable of expanding to 500,000 square feet. When the new expansion is finished, the company's headcount will increase by nearly 100 workers to about 400 total employees.

The U.S. public strongly believes in the importance of manufacturing for the economy and Americans' prosperity; however, when it comes to choosing AM as a career choice, it is at the bottom of the list. Out of seven key industries, AM ranks fifth as a career choice. Only 35% indicated they would encourage their children to pursue a career in the AM industry. In addition, when asked if their parents encouraged them to pursue a career in AM, only 17 percent responded in the affirmative.[10] These beliefs are also reflected in southeast Tennessee as noted in four-year college versus technical careers choices. Primary data sources which include, in part, regional employers' announcements of expansion and subsequent increases in hiring are noted

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[8] http://www.themanufacturinginstitute.org/Research/Skills-and-Training-Study/~/media/70965D0C4A944329894C96E0316DF336.ashx

[9] http://www.timesfreepress.com/news/business/aroundregion/story/2016/jun/30/lodge-still-cooking-after-120-yearscookware-m/373681

[10] http://www.themanufacturinginstitute.org/~/media/5856BC6196764320A6BEFA0D9962BE80/2012_Public_Perception_of_Manufacturing_Report.pdf

above. However, southeast Tennessee does not have enough skilled workers to meet the AM sector's expansion and labor needs. Local employers' feedback enabled the AMSIP Steering Committee to identify AM training so that high school students can obtain the skills needed to work in high-wage, high-demand jobs in AM. In order to meet the employers' current and future hiring needs, the focus of training will include mechatronics, industrial maintenance, machining and welding.

A secondary data source, the THEC/UT Labor Supply-Demand Studies, identifies career pathways that are in-demand and show prospects of growth. For example, the Production Pathway's 10-year supply estimates indicate 44 workers, but the demand is projected to be 4,599 workers. (see Attachment One). Additionally, educational pathways which lead to these in-demand jobs begin with the postsecondary credentials earned at a TCAT or community college. U.S. Census data which reflect the regions' educational attainment levels indicate a significant opportunity for improvement in terms of postsecondary credentials, particularly in high demand career pathways which this proposal addresses (Attachment One).

To further underscore the need, the southeast region has seen a large increase in manufacturing, mainly in automotive (VW) but also in home appliances (Whirlpool). The region has the most new projects in AM, doubling the investment that has taken place in middle and west Tennessee. There are also continued advancements of chemical and solar energy companies (Wacker Chemie) due to growing demand.[11] The AMSIP project is specifically developed to address the above-stated need. There are clear linkages between the region's needs and the program activities that will address the needs (see Attachment Nine).

[11] http://www.tennessee.gov/education/cte/doc/PathwaysTNStrategicPlan7.2.13.pdf

Program Plan: The program design involves eight high schools: Hamilton County—Tyner, Sequoyah, Central and East Hamilton High Schools; Marion County—Whitwell, Marion County, and South Pittsburg High Schools; and Bledsoe County—Bledsoe County High School. The ultimate goal for all eight schools is to either launch new or strengthen existing AM course offerings as well as dual enrollment and dual credit opportunities for students through Chattanooga State Community College (ChSCC).

In Hamilton County, Tyner, Central and East Hamilton high schools are focused primarily on mechatronics. Sequoyah students are focused on welding and machining training. Pathways programs are currently present at the four participating Hamilton County High Schools (HCHS) and include at least two of the following: Project Lead the Way (PLTW), Engineering Design (ED), Welding, IT, Robotics, and Principles of Manufacturing (PM).

In Marion County High Schools (MCHS), Pathways courses are also installed—PLTW, Welding, Machine Tool, and robotics; however, Whitwell High School currently only has PLTW. With LEAP funds, Whitwell will be able to launch new industry-driven industrial maintenance training. Dual enrollment or credit is to be offered at MCHSs.

Bledsoe County High School (BCHS) also offers the manufacturing cluster; courses include PM, Welding I and Welding II. Students may enroll in Welding II for additional credit. In order to meet regional industry needs, welding is BCHS's primary focus. Additionally, BCHS is increasing the number of welding classes from four to six beginning fall 2016.

The Project Timeline identifies key inputs and outputs and can be found in Attachment Four. It is important to note that, if awarded, the AMSIP team will request an extension of the grant period in order to finish at the end of the semester in spring 2019. AMSIP will track the following during the 30-month period: cohort enrollments, course completion, graduates,

internship completers, postsecondary enrollments, job placements and job placements in a Registered or Non-registered Apprenticeship program where offered (see Attachment Five). In Hamilton County, ChSCC is the training provider for two AM employer Registered Apprenticeship (RA) sponsors approved by the Office of Apprenticeship with the U.S. Department of Labor. The AMSIP project, in conjunction with the American Job Center at Chattanooga and the east Tennessee region's Apprenticeship Training Representative, will tap the existing and future RAs for apprentice placements to high school graduates who successfully complete the six-week, paid, academic-credit internship. The internship program will essentially serve as a pre-apprenticeship program if an RA program is pursued.

The sequence of events leading to the selection and commencement of the internship program are as follows: 1) announce to CTE students the paid/academic credit internship and work-based learning component; 2) industry partners provide students with job descriptions (i.e., welding, machinist, mechatronics, etc.); 3) high school students self-identify and declare their interest in AM career exploration (which occurs during the AM Academy), and declare their interest in the internship and postsecondary training (the internship may lead to a Registered Apprenticeship apprentice placement); 4) interested high school students apply for the Academy; 5) high school faculty make recommendations from applications for AM Academy which can lead to an internship; 6) announce successful candidates—those not selected will be put on the waiting list for opening and if not placed in the internship, they will be counseled on other opportunities to include learning support, and AM training pathways at ChSCC or TCAT at ChSCC; 7) CTE students graduate from high school; 8) one week after graduation, commence the AM Academy; 9) six-week Internship begins the week following the Academy; 10) post-internship RA

apprentice placement or continue postsecondary education to earn credential. Details regarding the Academy, the Junior Academy and the Internship can be found in Attachment Seven.

If awarded, LEAP funds will provide essential equipment dedicated to mitigating the training gaps in the region. In Marion County, a total of $147,577 is dedicated to new programs/courses and equipment for industrial maintenance (electro-mechanical), welding, and machining at Whitwell High School (WHS) and the ChSCC campus is allocated $201,026 for new AM training. Prior to equipment installation, WHS will require significant electrical upgrades estimated at a cost of $25,000. The AMSIP project is requesting $15,000 to offset the fiscal burden to the school district. Currently, WHS has no additional circuits to use for electrical outlets. If the upgrade is not done, WHS cannot install the requested equipment and offer new AM training. The upgrade will include a state-required architectural drawing, a new, separate power grid connection, a new circuit box and wiring for new 110 volt electrical outlets. BCHS is requesting $82,000 for the enhancement of existing AM pathway for welding, and three of HCHS's four participating high schools (Central, East Hamilton, and Sequoyah) are allocated $90,000 for the enhancement of existing as well as new courses for mechatronics, welding and machining. It is important to know that commuting patterns clearly indicate that residents travel to (and from) Hamilton County to work in the southeast region (see Attachment Six).

All of the purchased equipment will allow students to engage in hands-on learning and will allow them to demonstrate their newly learned skills and job-readiness. The spring 2017 cohort is projected to be approximately 450 10 – 12 grade students from the four participating HCHSs, the three MCHSs and BCHS. In order to measure the impact of outreach to address negative perceptions of manufacturing, the activities, in part, will include an Externship Program (EP) for 48 high school teachers, provide printed material describing careers in AM, and hold annual

essay contests on in-demand, high-wage occupations in AM. Based on previous experience, externships are powerful tools to help non-CTE teachers understand the career opportunities, pathways, and high wages that are associated with the AM sector. After the week-long externship, the teachers will attend a debriefing meeting in order to share their individual experiences and newly-found positive perceptions of the AM sector. Recurring summer events are planned and include the AM Academy for high school graduates, the Junior AM Academy for grades 7 – 10, the paid internship program and the teachers' externship program.

The AMSIP Team's Project Director is the Regional Projects Manager, Career & Workforce Development, with the Southeast Tennessee Development District (SETDD) and some of the grant management responsibilities will include convening quarterly meetings, email and phone communications, data procurement and management from LEAP partners, and any other reports. LEAP grant funds will allow ChSCC to hire a Program Manager (PM) and Outreach Coordinator (OC) to follow through on key deliverables and ensure that benchmarks of the program and project timeline are met. These staff will also engage in student recruitment, attrition control and outreach and coordinate with the CTE Directors, high school teachers and counselors to identify LEAP grant participants for the Academy and Internship program and assist with the summer Externship Program. The PM and OC will work with students to keep them on track to participate in the summer activities. PM and OC will also serve as Success Coaches and liaison to ensure students go through the hoops and move successfully into an internship, postsecondary training or apprentice placement and ensure that students stay on track to earn a postsecondary credential even if the student is not selected to participate in the internship program. Finally, the PM and OC will do outreach to middle schools to recruit for the Junior Academy and serve as an advocate for AM partners.

The program's grant-funded equipment, broadly used by regional manufacturers, will provide students the opportunity to develop valuable, hands-on skills needed in the workforce. The equipment will allow students to experience the mechanical and electrical processes as well as develop the skills needed to problem-solve in an environment that closely mirrors experiences in postsecondary training as well as the workplace. The equipment is necessary in order to support in-demand skills attainment—skills that will transfer across many industrial settings and that are essential to regional manufacturers' success and productivity. Details of the equipment are included in a separate attachment identified as "Equipment List" (Attachment Two).

Strength of Partnership: The AMSIP Steering Committee, comprised of SETDD's Regional Project Manager, Career & Workforce Development (Stephen Dunn), and ChSCC's Engineering and Computer Technology Department—Tim McGhee, Dean; Lyn Potter, Department Chair; and Lisa Jackson, Department Coordinator—and the CTE Directors—Kay Light (Marion Co.), Steve Reel (Bledsoe Co.), and David Cowan (Hamilton Co.)— have many years of experience working with each other and with industry partners and staying responsive to industry partner workforce needs. Partnerships (the Collaborative) have been forged through frequent and sustained "same-page" communication that identifies in-demand training and skills. The constant communication facilitates common focus and understanding of the training priorities. With the explosive growth in manufacturing jobs in the region, it is absolutely imperative the strong partnerships are maintained as we collectively try to balance workforce supply with workforce demand.

Specifically, the strength of industry partnerships with secondary education is demonstrated through participation in the various ongoing pathways activities: Career Awareness Symposium, Interview Bootcamp, classroom speakers, teachers' industry tours, student field trips, student

internships, CPT certification recognition and ongoing collaboration with CTE Director. In Hamilton County, VW's partnership with educators is demonstrated through the Mechatronics Akademie for high school juniors and seniors at the VW Academy (see Attachment Eight). Additionally in 2014, Gestamp, a local automotive supplier, donated a $30,000 Fanuc robotics trainer and a Programmable Logistics Controller to Tyner High School to strengthen the existing mechatronics program. Gestamp also paid for the Tyner mechatronics instructor's robotics trainer certification. In the fall of 2016, Central High School in Hamilton County will benefit from the same above-noted donations from Gestamp. These donations not only demonstrate the industry partners' commitment to strong partnerships, but they are also evidence of the desire to provide students with state-of-the-market training and to develop and increase a much needed skilled workforce pipeline for AM in the region.

ChSCC continues to build on strong partnerships between CTEs, the public workforce system (American Job Centers, Southeast Tennessee Workforce Development Board (STWDB); SETDD), and industry partners. ChSCC and industry partner relations are very strong as evidenced by the number of 18 current internships, six co-ops and six apprenticeships, both Registered and non-registered. The list of ChSCC's internships, co-ops and apprenticeships can be found in Attachment Eleven. In order to expand the AMSIP internship component, existing internships and co-ops will be identified for inclusion in the program.

There are also strong partnerships among those who will be actively participating in the grant activities, if awarded. For the purposes the AMSIP project, the CTE Directors will collect data and the LEAP-funded Program Manager and Outreach Coordinator along with the CTE Directors will work closely with the Project Director to meet timeline deadlines, ensure data collection, task completion and timely program reports. ChSCC and the CTE Directors are

responsible for ensuring equipment is procured, purchased, installed and maintained. For the AMSIP's work-based learning component, Wacker, Jasper Materials, Lodge Manufacturing and Valmont have committed to participate in the Internship Program providing interns' wages and tuition (see Attachment Three). Several more industry partners will be brought on board in addition to several listed in Attachment Eleven. Obtaining CEO approval for participation in the AMSIP Internship Program (and Academy) is relatively easy for local industry; however, for some national or international partners, more time is needed for senior management approval.

Budget Plan: There is a clear alignment between the funds requested and the grant activities. The equipment funds are not only critical to attracting students into the program, but also necessary to engage, train and subsequently to expand the regional manufacturing workforce pipeline. The equipment purchase also aligns with the goal of closing the skills/training gaps in the region and better-preparing students entering postsecondary (Drive to 55) and manufacturing jobs. The equipment will allow hands-on learning, and students can obtain the necessary skills to enter postsecondary training and the workforce. The outreach budget and summer Externship Program aligns with the overarching goal of increasing the AM labor supply and mitigating negative perceptions of a manufacturing career. The Salary and Benefits line items will fund the PM and OC which are considered program implementation roles and are currently not intended to be sustained. These roles will put "legs" on the outreach plan and provide a much needed recruitment voice at middle/high schools for the AMSIP project and, most importantly, for regional manufacturers. The travel budget is necessary for reimbursement of expenses associated with program activities including PM's and OC's travel to middle and high schools in the region and, in general, will allow program-funded staff to do their jobs. Additionally, ChSCC and SETDD are requesting funds to cover indirect costs and Project Director's role respectively.

Sustainability: The southeast Tennessee regional partners, K-12, postsecondary, the public workforce development system (SETDD/American Job Centers/STWDB), economic and community development, industry partners and others continue effective synergies and engage in collaborative efforts focused on workforce development. Pathways AM courses are operational in the counties enrollments increase annually. The AMSIP project, industry partner donations, scholarships, paid internships and Tennessee Promise and other grants and scholarship programs will provide foundational support for sustainability. The AMSIP project resources will serve to support sustainability through increased capacity, new equipment (which will be maintained and functional until no longer relevant for training), and a significant educational and recruitment outreach budget which supports the PM, OC, Externship Program, Essay Contest, and handout materials. The ChSCC campuses in Chattanooga and Marion County will serve to increase enrollments for ChSCC and TCAT Chattanooga students. The Marion County location, 2100 Main Street in Kimball, will, at minimum, serve Marion, Bledsoe and Grundy Counties as well as northwest Georgia and northeast Alabama, eliminate students' costly and time-consuming commute to ChSCC's main Chattanooga campus, and will positively impact the satellite's enrollments year over year due to accessibility. Educator partners will ensure continuation of dual enrollments and credits, and all partners will continue to make workforce development decisions that are both industry- and data-driven and introduce state-of-the-market technologies within curricula as needed. Finally, the most salient component of sustainability involves the continuation of strong partnerships and long-term relationships between employers, secondary education, community colleges and TCATs in order to increase the skilled workforce pipeline for AM career pathways.

APPENDIX B- Budget GRANT BUDGET				
LEAP Program Competitive Grant **Advanced Manufacturing Skills and Internship Program**				
The grant budget line-item amounts below shall be applicable only to expenses incurred during the following				
Applicable Period:		**BEGIN: September 14, 2016**		**END: March 13, 2019**
POLICY 03 Object Line-item Reference	**EXPENSE OBJECT LINE-ITEM CATEGORY** [1]	**GRANT CONTRACT**	**GRANTEE PARTICIPATION**	**TOTAL PROJECT**
1, 2	Salaries, Benefits & Taxes: 1 FTE 1 Part-time	**$223,331.00**	0.00	**$223,331.00**
4, 15	Professional Fee, Grant & Award 2	**$ 98,000.00**	0.00	**$98,000.00**
5, 6, 7, 8, 9, 10	Supplies, Telephone, Postage & Shipping, Occupancy, Equipment Rental & Maintenance, Printing & Publications	**$ 21,000.00**	0.00	**$ 21,000.00**
11, 12	Travel, Conferences & Meetings	**$ 8,000.00**	0.00	**$ 8,000.00**
18	Other Non-Personnel [2]	0.00	0.00	0.00
20	Capital Purchase 2	**$535,603.00**	0.00	**$535,603.00**
22	Indirect Cost	**$ 70,875.00**	0.00	**$ 70,875.00**
24	In-Kind Expense	0.00	0.00	0.00
25	**GRAND TOTAL**	**$956,809.00**	**0.00**	**$956,809.00**

1 Each expense object line-item shall be defined by the Department of Finance and Administration Policy 03, *Uniform Reporting Requirements and Cost Allocation Plans for Subrecipients of Federal and State Grant Monies, Appendix A.* (posted on the Internet at: www.state.tn.us/finance/act/documents/policy3.pdf).

2 Applicable detail follows this page if line-item is funded.

Line Items Detail

Salaries, Benefits & Taxes: 28 month period	
1 FTE Program Manager annual wages	$ 40,000
Annual benefits cost for above 1 FTE (53% of wages)	$ 18,000
Monthly wages/benefits cost: $3,333.33 + $1766.67 x 30 mo. =	$ 153,000
1 Part-time Outreach Coordinator annual wages	$ 28,000
FICA costs for above 1 part-time	$ 2,142
Monthly wages/benefits cost: $2,333.33 + $178.50 x 28 mo. =	$ 70,331
Subtotal	**$223,331**
Professional Fee, Grant and Award	
Externships—48 teachers $1,000 stipend (24 teachers X 2 summers)	$ 48,000
Southeast Tennessee Development District: Project Director	$ 50,000
	$ 98,000
Supplies, Telephone, Postage, Shipping, Occupancy, Equipment Rental & Maintenance	
Outreach activities—two Advanced Manufacturing careers essay contests all seven high schools with lunch (pizzas, soda, etc.) and prizes ($2,500 X 2)	**$** 5,000
Hamilton Co./Marion Co. locations summer Advanced Manufacturing Academies; four events during two summers for 5 days each; approx. total of 50 participates each summer X 2 (t-shirts $3,000, food $4,000, supplies $1,000	$ 8,000
Junior Adv. Mfg. Academies; three counties/Saturday event for two summers; 7-10 graders at ChSCC; (lunches, snacks $1,500 X 2)	$ 3,000
Outreach materials—parents, students (brochures/handouts/flyers)	$ 1,000
AMSIP ChSCC staff supplies (2 laptops, 2 printers, other)	$ 4,000
Subtotal	**$ 21,000**
Travel, Conferences & Meetings	
AMSIP ChSCC staff (2) regional travel to high/middle schools	**$ 8,000**
Capital Purchase (see Equipment Details in Attachment Two)	
Marion Co. Whitwell H.S. equipment—industrial maintenance	$ 147,577
Electrical upgrade for Whitwell High School Marion County	$ 15,000
Bledsoe Co. H.S—welding, welding simulator	$ 82,000
Hamilton County--3 schools—mechatronics, machining	$ 90,000
ChSCC campus in Marion Co.—advanced manufacturing	$ 201,026
	$ 535,603
Indirect Cost	
Chattanooga State Community College	**$ 70,875**
Grand Total	**$ 956,809**

Attachment One

Data Lists

Career Path: 13.1 Production Pathway

SUPPLY

CIP	Program	STEM	Average Graduates 2000-08	2018	2008-18
480501	Machine Tool Technology/Machinist				
	Awards at least 1 but less than 2 academic years		1	4	2
	Associate degrees		0	1	1
	Awards at least 2 but less than 4 academic years		2	0	1
			4	**5**	**4**
480503	Machine Shop Technology/Assistant				
	Awards at least 1 but less than 2 academic years		8	22	12
	Associate degrees		4	0	0
			12	**22**	**12**
480507	Tool and Die Technology/Technician				
	Associate degrees		0	0	0
			0	**0**	**0**
480508	Welding Technology/Welder				
	Awards of less than 1 academic year		2	0	2
	Awards at least 1 but less than 2 academic years		20	26	25
	Associate degrees		3	0	0
			24	**26**	**27**
	13.1 TOTAL SUPPLY		**40**	**53**	**44**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
113051	Industrial production managers Work experience in a related occupation	120
435111	Weighers, measurers, checkers, and samplers, recordkeeping Short-term on-the-job training	46
511011	First-line supervisors/managers of production and operating workers Work experience in a related occupation	259
512011	Aircraft structure, surfaces, rigging, and systems assemblers Moderate-term on-the-job training	1
512021	Coil winders, tapers, and finishers Short-term on-the-job training	6
512022	Electrical and electronic equipment assemblers Short-term on-the-job training	40
512023	Electromechanical equipment assemblers Short-term on-the-job training	39
512031	Engine and other machine assemblers Short-term on-the-job training	9
512091	Fiberglass laminators and fabricators Moderate-term on-the-job training	35
512092	Team assemblers Moderate-term on-the-job training	1,088
512093	Timing device assemblers, adjusters, and calibrators Moderate-term on-the-job training	1
514011	Computer-controlled machine tool operators, metal and plastic Moderate-term on-the-job training	44
514012	Numerical tool and process control programmers Work experience in a related occupation	15
514021	Extruding and drawing machine setters, operators, and tenders, metal and plastic Moderate-term on-the-job training	35

Career Path: 13.1 Production Pathway

514022	Forging machine setters, operators, and tenders, metal and plastic Moderate-term on-the-job training	32
514023	Rolling machine setters, operators, and tenders, metal and plastic Moderate-term on-the-job training	10
514031	Cutting, punching, and press machine setters, operators, and tenders, metal and plas Moderate-term on-the-job training	173
514032	Drilling and boring machine tool setters, operators, and tenders, metal and plastic Moderate-term on-the-job training	11
514033	Grinding, lapping, polishing, and buffing machine tool setters, operators, and tenders Moderate-term on-the-job training	37
514034	Lathe and turning machine tool setters, operators, and tenders, metal and plastic Moderate-term on-the-job training	26
514035	Milling and planing machine setters, operators, and tenders, metal and plastic Moderate-term on-the-job training	10
514041	Machinists Long-term on-the-job training	152
514051	Metal-Refining Furnace Operators and Tenders Moderate-term on-the-job training	14
514052	Pourers and Casters, Metal Moderate-term on-the-job training	8
514061	Model makers, metal and plastic Long-term on-the-job training	1
514062	Patternmakers, metal and plastic Long-term on-the-job training	0
514071	Foundry mold and coremakers Moderate-term on-the-job training	49
514072	Molding, coremaking, and casting machine setters, operators, and tenders, metal an Moderate-term on-the-job training	50
514081	Multiple machine tool setters, operators, and tenders, metal and plastic Moderate-term on-the-job training	41
514111	Tool and die makers Long-term on-the-job training	16
514121	Welders, cutters, solderers, and brazers Postsecondary vocational training	314
514122	Welding, soldering, and brazing machine setters, operators, and tenders Postsecondary vocational training	51
514191	Heat treating equipment setters, operators, and tenders, metal and plastic Moderate-term on-the-job training	29
514192	Lay-out workers, metal and plastic Moderate-term on-the-job training	1
514193	Plating and coating machine setters, operators, and tenders, metal and plastic Moderate-term on-the-job training	15
514194	Tool grinders, filers, and sharpeners Moderate-term on-the-job training	8
516031	Sewing machine operators Moderate-term on-the-job training	37
516051	Sewers, hand Short-term on-the-job training	4
516061	Textile bleaching and dyeing machine operators and tenders Moderate-term on-the-job training	4
516062	Textile cutting machine setters, operators, and tenders Moderate-term on-the-job training	9
516063	Textile knitting and weaving machine setters, operators, and tenders Long-term on-the-job training	3
516064	Textile winding, twisting, and drawing out machine setters, operators, and tenders Moderate-term on-the-job training	17

Career Path: 13.1 Production Pathway

516091	Extruding and forming machine setters, operators, and tenders, synthetic and glass fi Moderate-term on-the-job training	8
516092	Fabric and apparel patternmakers Long-term on-the-job training	2
516093	Upholsterers Long-term on-the-job training	10
517011	Cabinetmakers and bench carpenters Long-term on-the-job training	62
517021	Furniture finishers Long-term on-the-job training	10
517031	Model makers, wood Long-term on-the-job training	2
517032	Patternmakers, wood Long-term on-the-job training	0
517042	Woodworking machine setters, operators, and tenders, except sawing Moderate-term on-the-job training	37
518011	Nuclear Power Reactor Operators Long-term on-the-job training	0
518012	Power Distributors & Dispatchers Long-term on-the-job training	3
518013	Power Plant Operators Long-term on-the-job training	10
518091	Chemical plant and system operators Long-term on-the-job training	27
519011	Chemical equipment operators and tenders Moderate-term on-the-job training	12
519021	Crushing, grinding, and polishing machine setters, operators, and tenders Moderate-term on-the-job training	12
519022	Grinding and polishing workers, hand Moderate-term on-the-job training	22
519023	Mixing and blending machine setters, operators, and tenders Moderate-term on-the-job training	116
519031	Cutters and trimmers, hand Short-term on-the-job training	16
519032	Cutting and slicing machine setters, operators, and tenders Moderate-term on-the-job training	59
519041	Extruding, forming, pressing, and compacting machine setters, operators, and tender Moderate-term on-the-job training	115
519051	Furnace, kiln, oven, drier, and kettle operators and tenders Moderate-term on-the-job training	14
519061	Inspectors, testers, sorters, samplers, and weighers Moderate-term on-the-job training	197
519071	Jewelers and precious stone and metal workers Postsecondary vocational training	13
519111	Packaging and filling machine operators and tenders Short-term on-the-job training	186
519121	Coating, painting, and spraying machine setters, operators, and tenders Moderate-term on-the-job training	71
519122	Painters, transportation equipment Moderate-term on-the-job training	35
519123	Painting, coating, and decorating workers Short-term on-the-job training	20
519131	Photographic process workers Short-term on-the-job training	16
519132	Photographic processing machine operators Short-term on-the-job training	33

Career Path: 13.1 Production Pathway

519191	Cementing and gluing machine operators and tenders Moderate-term on-the-job training	20
519192	Cleaning, washing, and metal pickling equipment operators and tenders Moderate-term on-the-job training	7
519193	Cooling and freezing equipment operators and tenders Moderate-term on-the-job training	3
519194	Etchers and engravers Long-term on-the-job training	1
519195	Molders, shapers, and casters, except metal and plastic Moderate-term on-the-job training	112
519196	Paper goods machine setters, operators, and tenders Moderate-term on-the-job training	50
519197	Tire builders Moderate-term on-the-job training	69
519198	Helpers--Production workers Short-term on-the-job training	333
537063	Machine feeders and offbearers Short-term on-the-job training	36
	13.1 TOTAL DEMAND	**4,599**

SUPPLY:	**44**
DEMAND:	**4,599**
Demand minus Supply:	**4,555**
Supply to Demand Ratio:	**0.01**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY:	**2**
Demand minus Supply:	**-2**
Supply to Demand Ratio:	**-**

Career Path: 13.2 Manufacturing Production Process Development Pathway

SUPPLY

CIP	Program	STEM	Average Graduates 2000-08	2018	2008-18
190901	Apparel and Textiles, General				
	Associate degrees		0	0	0
	Bachelor's degrees		36	92	70
			36	**92**	**70**
410301	Chemical Technology/Technician				
	Awards of less than 1 academic year	Yes	0	1	1
	Awards at least 1 but less than 2 academic years	Yes	2	13	9
	Associate degrees	Yes	6	0	0
			7	**14**	**10**
419999	Science Technologies/Technicians, Other				
	Associate degrees		189	155	144
	Bachelor's degrees		1	0	0
			189	**155**	**144**
	13.2 TOTAL SUPPLY		**233**	**261**	**223**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
131023	Purchasing agents, except wholesale, retail, and farm products Long-term on-the-job training	143
173026	Industrial engineering technicians Associate degree	20
173027	Mechanical engineering technicians Associate degree	13
472011	Boilermakers Long-term on-the-job training	9
499044	Millwrights Long-term on-the-job training	49
	13.2 TOTAL DEMAND	**234**

SUPPLY:	**223**
DEMAND:	**234**
Demand minus Supply:	**11**
Supply to Demand Ratio:	**0.95**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY:	**213**
DEMAND:	**33**
Demand minus Supply:	**-180**
Supply to Demand Ratio:	**6.47**

Career Path: 13.3 Maintenance, Installation and Repair Pathway

SUPPLY

CIP	Program	STEM	Average Graduates 2000-08	2018	2008-18
150303	Electrical, Electronic & Communications Engineering Technology/Technician				
	Awards of less than 1 academic year	Yes	13	67	47
	Associate degrees	Yes	191	64	159
	Bachelor's degrees	Yes	29	63	66
			233	**194**	**272**
150399	Electrical & Electronic Engineering Technologies/Technicians, Other				
	Associate degrees		116	0	0
	Bachelor's degrees		18	0	0
			135	**0**	**0**
150401	Biomedical Technology/Technician				
	Associate degrees	Yes	1	0	0
			1	**0**	**0**
150403	Electromechanical Technology/Electromechanical Engineering Technology				
	Awards of less than 1 academic year	Yes	7	0	1
	Associate degrees	Yes	8	0	0
			15	**0**	**1**
150405	Robotics Technology/Technician				
	Awards at least 1 but less than 2 academic years	Yes	0	2	1
	Associate degrees	Yes	1	0	0
			1	**2**	**1**
150612	Industrial Technology/Technician				
	Awards of less than 1 academic year	Yes	1	0	0
	Awards at least 1 but less than 2 academic years	Yes	1	0	0
	Associate degrees	Yes	85	126	118
	Bachelor's degrees	Yes	56	0	22
	Masters degrees	Yes	9	10	9
			151	**136**	**148**
150613	Manufacturing Technology/Technician				
	Awards of less than 1 academic year	Yes	1	4	2
	Awards at least 1 but less than 2 academic years	Yes	1	5	3
	Associate degrees	Yes	2	19	12
	Bachelor's degrees	Yes	3	20	15
			7	**48**	**32**
150701	Occupational Safety and Health Technology/Technician				
	Associate degrees	Yes	1	0	0
			1	**0**	**0**
150805	Mechanical Engineering/Mechanical Technology/Technician				
	Associate degrees	Yes	27	11	13
	Bachelor's degrees	Yes	0	0	0
			27	**11**	**13**

Career Path: 13.3 Maintenance, Installation and Repair Pathway

151201	Computer Engineering Technology/Technician				
	Awards of less than 1 academic year	Yes	5	33	25
	Associate degrees	Yes	27	0	1
	Bachelor's degrees	Yes	15	2	4
			47	**35**	**29**
151202	Computer Technology/Computer Systems Technology				
	Awards of less than 1 academic year	Yes	3	0	3
	Associate degrees	Yes	28	45	31
			31	**45**	**34**
470000	Mechanics and Repairers, General				
	Associate degrees		3	26	17
			3	**26**	**17**
470101	Electrical/Electronics Equipment Installation & Repair, General				
	Awards at least 1 but less than 2 academic years		1	0	0
	Associate degrees		10	0	2
			11	**0**	**2**
470104	Computer Installation and Repair Technology/Technician				
	Awards at least 1 but less than 2 academic years		3	0	3
			3	**0**	**3**
470303	Industrial Mechanics and Maintenance Technology				
	Awards of less than 1 academic year		3	0	0
	Awards at least 1 but less than 2 academic years		10	8	9
	Associate degrees		5	0	0
			17	**8**	**9**
470399	Heavy/Industrial Equipment Maintenance Technologies, Other				
	Associate degrees		1	3	3
	Awards at least 2 but less than 4 academic years		8	10	11
			8	**13**	**13**
	13.3 TOTAL SUPPLY		**690**	**518**	**575**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
491011	First-line supervisors/managers of mechanics, installers, and repairers Work experience in a related occupation	272
492011	Computer, automated teller, and office machine repairers Postsecondary vocational training	41
492021	Radio mechanics Postsecondary vocational training	2
492022	Telecommunications equipment installers and repairers, except line installers Postsecondary vocational training	75
492092	Electric motor, power tool, and related repairers Postsecondary vocational training	27
492094	Electrical and electronics repairers, commercial and industrial equipment Postsecondary vocational training	33
492097	Electronic home entertainment equipment installers and repairers Postsecondary vocational training	33
492098	Security and fire alarm systems installers Postsecondary vocational training	44
493053	Outdoor power equipment and other small engine mechanics Moderate-term on-the-job training	15

Career Path: 13.3 Maintenance, Installation and Repair Pathway

499041	Industrial machinery mechanics Long-term on-the-job training	124
499042	Maintenance and repair workers, general Moderate-term on-the-job training	732
499043	Maintenance workers, machinery Moderate-term on-the-job training	29
499062	Medical equipment repairers Associate degree	45
499063	Musical instrument repairers and tuners Long-term on-the-job training	3
499064	Watch repairers Long-term on-the-job training	1
499091	Coin, vending, and amusement machine servicers and repairers Moderate-term on-the-job training	36
499094	Locksmiths and safe repairers Moderate-term on-the-job training	7
	13.3 TOTAL DEMAND	**1,519**

SUPPLY:	**575**
DEMAND:	**1,519**
Demand minus Supply:	**944**
Supply to Demand Ratio:	**0.38**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY:	**481**
DEMAND:	**45**
Demand minus Supply:	**-436**
Supply to Demand Ratio:	**10.69**

Career Path: 15.1 Engineering and Technology Pathway

SUPPLY

CIP	Program	STEM	Average Graduates 2000-08	2018	2008-18
140101	Engineering, General				
	Associate degrees	Yes	3	1	4
	Bachelor's degrees	Yes	88	0	32
	Masters degrees	Yes	17	19	15
	Doctoral degrees	Yes	11	21	19
			119	41	70
140201	Aerospace, Aeronautical and Astronautical Engineering				
	Bachelor's degrees	Yes	16	47	35
	Masters degrees	Yes	5	15	11
	Doctoral degrees	Yes	1	0	1
			22	62	46
140301	Agricultural/Biological Engineering and Bioengineering				
	Bachelor's degrees	Yes	6	5	5
	Masters degrees	Yes	4	12	9
	Doctoral degrees	Yes	1	4	3
			11	21	16
140401	Architectural Engineering				
	Bachelor's degrees	Yes	12	10	12
			12	10	12
140501	Biomedical/Medical Engineering				
	Bachelor's degrees	Yes	68	152	121
	Masters degrees	Yes	28	32	35
	Doctoral degrees	Yes	9	25	20
			104	209	176
140701	Chemical Engineering				
	Bachelor's degrees		75	17	36
	Masters degrees		16	5	7
	Doctoral degrees		7	16	13
			98	38	55
140801	Civil Engineering, General				
	Bachelor's degrees	Yes	169	123	139
	Masters degrees	Yes	54	94	70
	Doctoral degrees	Yes	7	23	16
			230	240	225
141001	Electrical, Electronics and Communications Engineering				
	Bachelor's degrees	Yes	192	42	93
	Masters degrees	Yes	83	145	129
	Doctoral degrees	Yes	14	16	19
			290	203	241
141101	Engineering Mechanics				
	Bachelor's degrees	Yes	4	33	20
			4	33	20

Career Path: 15.1 Engineering and Technology Pathway

141201	Engineering Physics				
	Bachelor's degrees	Yes	2	2	1
			2	**2**	**1**
141301	Engineering Science				
	Bachelor's degrees	Yes	45	209	141
	Masters degrees	Yes	8	20	16
	Doctoral degrees	Yes	2	0	1
			55	**229**	**158**
141401	Environmental/Environmental Health Engineering				
	Masters degrees	Yes	16	14	16
	Doctoral degrees	Yes	2	7	4
			18	**21**	**20**
141801	Materials Engineering				
	Bachelor's degrees	Yes	5	1	3
	Masters degrees	Yes	6	17	12
	Doctoral degrees	Yes	7	40	26
			18	**58**	**41**
141901	Mechanical Engineering				
	Bachelor's degrees	Yes	227	216	233
	Masters degrees	Yes	53	67	59
	Doctoral degrees	Yes	7	16	11
			287	**299**	**303**
142001	Metallurgical Engineering				
	Masters degrees	Yes	2	0	0
	Doctoral degrees	Yes	1	0	0
			2	**0**	**0**
142301	Nuclear Engineering				
	Bachelor's degrees	Yes	14	60	45
	Postbaccalaureate certificates	Yes	1	3	3
	Masters degrees	Yes	11	27	21
	Doctoral degrees	Yes	3	0	1
			29	**90**	**70**
142701	Systems Engineering				
	Doctoral degrees	Yes	1	4	3
			1	**4**	**3**
143201	Polymer/Plastics Engineering				
	Masters degrees	Yes	3	3	2
	Doctoral degrees	Yes	2	0	1
			5	**3**	**3**
143501	Industrial Engineering				
	Bachelor's degrees	Yes	42	0	6
	Masters degrees	Yes	28	0	0
	Doctoral degrees	Yes	1	8	7
			71	**8**	**13**

Career Path: 15.1 Engineering and Technology Pathway

149999	Engineering, Other				
	Associate degrees		0	0	0
	Bachelor's degrees		1	0	0
	Masters degrees		19	0	3
			19	**0**	**3**
150000	Engineering Technology, General				
	Associate degrees	Yes	43	244	153
	Bachelor's degrees	Yes	108	152	128
	Masters degrees	Yes	38	0	6
			189	**396**	**288**
151501	Engineering/Industrial Management				
	Bachelor's degrees	Yes	31	198	137
	Masters degrees	Yes	9	30	24
			40	**228**	**161**
159999	Engineering Technologies/Technicians, Other				
	Associate degrees		0	0	0
	Bachelor's degrees		6	0	7
	Masters degrees		2	0	0
			8	**0**	**7**
	15.1 TOTAL SUPPLY		**1,636**	**2,195**	**1,929**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
119041	Engineering managers Bachelor's or higher degree, plus work experience	64
172011	Aerospace engineers Bachelor's degree	12
172021	Agricultural engineers Bachelor's degree	5
172041	Chemical engineers Bachelor's degree	20
172061	Computer hardware engineers Bachelor's degree	24
172071	Electrical engineers Bachelor's degree	47
172072	Electronics engineers, except computer Bachelor's degree	50
172111	Health and safety engineers, except mining safety engineers and inspectors Bachelor's degree	14
172112	Industrial engineers Bachelor's degree	141
172131	Materials engineers Bachelor's degree	5
172141	Mechanical engineers Bachelor's degree	102
172151	Mining and geological engineers, including mining safety engineers Bachelor's degree	1
172161	Nuclear engineers Bachelor's degree	5
172171	Petroleum engineers Bachelor's degree	2

Career Path: 15.1 Engineering and Technology Pathway

172199	Engineers, all other Bachelor's degree	60
173011	Architectural and civil drafters Postsecondary vocational training	37
173012	Electrical and electronics drafters Postsecondary vocational training	16
173023	Electrical and electronic engineering technicians Associate degree	39
173024	Electro-mechanical technicians Associate degree	2
173029	Engineering technicians, except drafters, all other Associate degree	8
173031	Surveying and mapping technicians Moderate-term on-the-job training	23
273042	Technical writers Bachelor's degree	7
	15.1 TOTAL DEMAND	**684**

SUPPLY:	**1,929**
DEMAND:	**684**
Demand minus Supply:	**-1,245**
Supply to Demand Ratio:	**2.82**

Supply (Assoc or higher) / Demand (requires Assoc or higher)	
SUPPLY :	**1,929**
DEMAND:	**608**
Demand minus Supply:	**-1,321**
Supply to Demand Ratio:	**3.17**

Attachment Two

Equipment List

Hamilton County High Schools Equipment

Central High School:

2 Festo Mechatronics kits at $11,000 per kit (subtotal: $22,000)
2 Amatrol kits in Mechanical Systems at a cost $3,500.00 per kit (subtotal: $7,000)
1 Amatrol Manual Machine Tool Station at $7500.00
1 Amatrol Pneumatics learning system at $5000.00.
Central High School total: **$41,500**

East Hamilton:

2 Amatrol kits in Mechanical Systems at a cost $3,500 per kit (subtotal: $7,000)
1 Amatrol Manual Machine Tool Station at $7500
1 Amatrol Pneumatics learning system at $5000.00
Amatrol AC/DC learning System at $6000.00
East Hamilton High School total: **$25,500**

Sequoyah:

CNC Machine Learning System: **$23,000**

Hamilton County Grand Total: $90,000

Note: Tyner High School has no equipment needs at this time

Bledsoe County High School Equipment List

Festos mechatronics training kit: $14,000
Plasma cam precision metal cutting: $18,000
Lincoln welding simulator: $50,000

Grand total Bledsoe County High School: **$82,000**

Marion County Equipment List

Whitwell High School

See the selected electro-mechanical and industrial maintenance equipment noted in list.

Grand total cost of equipment: $147,577

Note: No equipment is being requested for Marion County and South Pittsburg High Schools.

equipment list for Marion County - Whitwell High

items listed are **Amatrol**. This company partners with NIMS, MSSC, and NOCTI in building training equipment for use in industry.

model number	description	quantity	price each	total price
950-ME1SB	Mechanical Drives 1 Learning System	1	12,457.00	12,457.00
41210	Hand Tool Package 1 - Mechanical	1	1,080.00	1,080.00
95-ME2	Mechanical Drives 2 Learning System	1	6,340.00	6,340.00
18588	Viscosimeter	1	635.00	635.00
95-ME3	Mechanical Drives 3 Learning System	1	5,850.00	5,850.00
41211	Hand Tool Package 2 - Mechanical	1	760.00	760.00
T7017A	AC/DC Electrical Learning System	1	5,121.00	5,121.00
82-610	Mobile Technology Workstation, Type 1 - 6'	1	1,130.00	1,130.00
90-EC1A	Electric Relay Control Learning System	1	3,270.00	3,270.00
82-610	Mobile Technology Workstation, Type 1 - 6'	1	1,130.00	1,130.00
850-P1	Basic Pneumatics Learning System	1	4,760.00	4,760.00
85-1P	Intermediate Pneumatics Learning System	1	2,350.00	2,350.00
41221	Hand Tool Package - Pneumatic Systems	1	580.00	580.00
85-MT5	Electric Motor Control Learning System	1	10,337.00	10,337.00
EL613-43	Prony Brake	1	710.00	710.00
41202	Hand Tool Package - Motor Control	1	400.00	400.00
82-610	Mobile Technology Workstation, Type 1 - 6'	1	1,130.00	1,130.00
85-MT5AB10	PLC Motor Control Learning System - AB MicroLogix 1000	1	2,540.00	2,540.00
82-704W	PLC Programming Software for MicroLogix	1	1,100.00	1,100.00
17373	MicroLogix USB Communication Cable	1	100.00	100.00
85-MT5B	Reduced Voltage Starting Learning System	1	1,850.00	1,850.00
85-MT5C	Variable Frequency AC Drive Learning System	1	2,490.00	2,490.00
85-MT5D	Electronic Sensors Learning System	1	1,317.00	1,317.00
85-MT5E	Electronic Counter Learning System	1	780.00	780.00
85-MT5F	SCR Speed Control Learning System	1	1,960.00	1,960.00
85-MT2	Basic Electrical Machines Learning System	1	10,961.00	10,961.00
41201	Hand Tool Package - Electrical Machines	1	140.00	140.00
18414	Photo Tachometer	1	530.00	530.00
82-610	Mobile Technology Workstation, Type 1 - 6'	1	1,130.00	1,130.00
85-MT2B	DC Generators Learning System	1	2,380.00	2,380.00
85-MT2C	Alternator/Synchronous Motor Learning Syste	1	7,854.00	7,854.00
85-MT2D	Wound Rotor Motor Learning System	1	8,249.00	8,249.00
T7018	Power and Control Electronics Learning Systen	1	12,950.00	12,950.00
17539	Oscope Tektronix TDS2001C model	1	1,130.00	1,130.00
82-610	Mobile Technology Workstation, Type 1 - 6'	1	1,130.00	1,130.00
Lincoln AD2436-1	VRTEX Mobile One-Pak welding simulator	1	24,096.00	24,096.00
	Installation, setup, and 2 day training			4,000.00
	Shipping			2,850.00
Total				147,577.00

Specifications for Marion County/Whitwell High equipment:

. equipment to include on-line curriculum
2. curriculum program to include electronic grading for teacher
3. on-going teacher training for all equipment and curriculum
4. tech support for both hardware and software
5. purchase to include all software needed for each piece of equipment
6. purchase to include all needed furniture to accommodate table-top systems
7. vendor to provide layout of lab and collaboration with architect for needed electrical upgrade

Chattanooga State Equipment List

Marion County Campus

See the selected equipment for advanced manufacturing training

Grand total cost of equipment: $201,026

Chattanooga State Community College
LEAP Grant Equipment Budget 2016

Item	Quantity	Unit Cost	Total Cost
Learning Labs			
CNC BenchMill 6000	1	$15,995.00	$15,995.00
Coolant System	1	$436.30	$436.30
Jog Pendant Handwheel	1	$851.88	$851.88
Dual Axis Pneumatic Vise	1	$793.50	$793.50
4-Station ATC, Table-mount	1	$545.00	$545.00
Machinist Kit	1	$2,278.00	$2,278.00
Mobile Workbench 1500x1140mm (incl. Wheels)	2	$2,573.00	$5,146.00
BenchTurn 7000 Starter Bundle (110V)	1	$18,517.00	$18,517.00
Jog Pendant Handwheel	1	$851.88	$851.88
Pneumatic Air Chuck (7000)	1	$2,031.00	$2,031.00
Pneumatic Shield Opener with Sensor (7000)	1	$572.45	$572.45
Brass Rod Turning 50 Pieces	1	$1,256.92	$1,256.92
7 Piece Turning Tool Set with Inserts 10x10 mm	1	$243.00	$243.00
Scorbot ER4u	1	$11,795.00	$11,795.00
Scorbot ER4u Fundamentals	1	$2,995.00	$2,995.00
Enf Effector Attachment	1	$134.00	$134.00
Linear Side Base	1	$8,005.00	$8,005.00
Palletizing rack with pegboard desing inc. pins	1	$615.00	$615.00
Pneumatic Feeder for Round Products	1	$1,540.00	$1,540.00
Pneumatic Feeder for Rectangular Products	1	$1,500.00	$1,500.00
Installation and Instructor Orientation	1	$7,500.00	$7,500.00
Freight	1	$3,250.00	$3,250.00
Virtual CNC Milling Curriculum	1	$2,995.00	$2,995.00
Virtual CNC Turning w/Bench Curriculum	1	$2,995.00	$2,995.00
Totals		$90,268.93	$92,841.93
Armatrol			
Basic Fluid Power Learning System	1	$20,069.00	$20,069.00
Hydraulic Oil (10 gallon can)	1	$125.00	$125.00
Hand Tool Package	1	$1,300.00	$1,300.00
Basic Hydraulic Learning System	1	$7,176.00	$7,176.00
Basic Pneumatics Learning System	1	$3,950.00	$3,950.00
Installation, Setup, and Curriculum Introduction	1	$1,000.00	$1,000.00
Shipping	1	$980.00	$980.00
Totals		$34,600.00	$34,600.00
Dell			
Workstation Dell Inspiron 24" 7000 Touch	35	$1,249.00	$43,715.00
Totals	35	$1,249.00	$43,715.00
Hewlett Packard			
Laser Jet Enterprise M712n Laser Printer	2	$1,889.99	$3,779.98
Totals	2	$1,889.99	$3,779.98
MakerBot			
Digitizer Desktop 3D Scanner	3	$799.00	$2,397.00

Replicator Desktop 3D Printer (5th Generation)		8	$2,499.00	$19,992.00
	Totals		$3,298.00	$22,389.00
LNS Technologies				
PIM-Shooter Model 150A		2	$1,500.00	$3,000.00
Molds various		2	$65.00	$130.00
Blank mold		2	$95.00	$190.00
Regular Epoxy Frame		2	$95.00	$190.00
Game Chip Mold		2	$85.00	$170.00
Various Plastic Pellets		2	$10.00	$20.00
	Totals		$1,850.00	$3,700.00
Total Order Costs				$201,025.91

Attachment Three

Employer Commitment Letters

WACKER

JOHN TAYLOR
HR SPECIALIST

WACKER Chemical Corporation
553 Wacker Blvd.
Charleston, TN 37310
Tel. (423) 780-8361
Fax 517 264-0994
John.Taylor@wacker.com

July 23, 2016

Reference – Letter of Support

Dr. Flora Tydings
President
Chattanooga State Community College
4501 Amnicola Highway
Chattanooga, TN. 37406

WACKER will commit to supporting the Advanced Manufacturing Skills and Internship Program (AMSIP). We at WACKER are committed to partnering with Secondary and Post Secondary schools in order to provide training, which will allow students to transition into advanced skills jobs in the chemical manufacturing sector. Our company experiences the need to develop a highly skilled workforce on a daily basis. We at WACKER are increasing our workforce rapidly as the manufacturing needs of this region continue to expand. Thus, we commit to participating in student recruitment events during the spring of 2017, and providing internships within our company for students engaged in AMSIP. Students will be paid at the rate of $12 per hour for a minimum of 25 hours per week for six weeks. Our goal is to set them on a path to associates through Chemical Engineering Technology major.

In addition WACKER is interested in supporting the project's summer Advanced Manufacturing Academy, which will help solidify the intern's transition to the internship. The academy will work with students on safety, soft skills, writing skills and communication as well as other topics that may need reinforcement. We would be willing to participate through providing speakers, activities or serving as mentors for our potential interns.

WACKER strongly supports Chattanooga State, the Southeast Development District and the school districts of Hamilton, Marion, and Bledsoe Counties as they work to provide a well-trained workforce for our industry.

Sincerely,

WACKER

John Taylor
HR Specialist

Dr. Flora Tydings
Chattanooga State Community College
4501 Amnicola Highway
Chattanooga, TN 37406

July 21, 2016

Lodge Manufacturing Company would like to offer support to the partners of the Advanced Manufacturing Skills and Internship program (AMSIP).

Lodge Manufacturing Company is constantly seeking top quality employees to fill the various technical positions to operate and maintain our advance manufacturing operations. As the manufacturing industry continues to grow in the East Tennessee area, we know that attracting and retaining top quality employees will continue to be an on-going challenge. We support all efforts to increase the number of qualified candidates for technical positions in our industry, and believe that AMSIP will provide a useful path toward achieving this goal.

Thus, we commit to participating in student recruitment events during the spring of 2017 and providing one or more internships within our company for students participating in AMSIP. Student interns will be paid at the entry level rate of the position they will be working in during their six week internship. The rates will range from $12.25 per hour to $14.10 per hour for up to a minimum of twenty five (25) hours per week. We will also provide an additional $520 per student intern to cover tuition at Chattanooga State so the student interns can earn academic credit for their internships. Our goal is to set them on a path to associate's degrees and certificates that will lead them back to permanent jobs within our industry.

In addition, Lodge Manufacturing Company is interested in supporting the project's summer Career Success Workshop which is designed to introduce students to the skills needed to be successful as interns within our company. We would like to collaborate with project partners to make presentations and/or co-teach part of the course, mentor students, and provide some financial assistance toward student lunches and supplies.

Lodge Manufacturing Company strongly supports Chattanooga State, the Southeast Development District, and the school districts of Marion, Bledsoe and Hamilton counties as they try to provide a well-trained workforce for our industry.

Sincerely,

Dave Shouse
SR. VP of Organizational Development

P.O. Box 380 • South Pittsburg • Tennessee • 37380
Telephone 423.837.7181 • Fax 423.837.8279
www.lodgemfg.com

valmont NEWMARK

Dr. Flora Tydings
President
Chattanooga State Community College
4501 Amnicola Highway
Chattanooga, TN 37406

July 22, 2016

Dear Dr. Tydings:

Please accept this letter in support of the Advanced Manufacturing Skills and Internship Program (AMSIP). Students from all five districts are within our hiring pool at Valmont Newmark and we strongly support this initiative to prepare them for entry into the advanced manufacturing workforce.

Valmont Newmark will continue to partner with the Marion County School System to provide support in developing our future workforce. We will provide an internship opportunity for one student at an hourly rate of $10.00 per hour for a minimum of 25 hours per week for up to 6 weeks. We will also donate the approximate $520 dollars in tuition expenses at Chattanooga State to support the student receiving academic credit for participation.

The AMSIP project will aid in providing students with the foundation required to become successful in advanced manufacturing careers. Recruiting and hiring qualified applicants who have the combination of "hard" and "soft" skills is vital to the future of Valmont Newmark and every other industry. We will continue to partner with the Marion County School System and Chattanooga State to provide support in developing our future workforce.

Regards,
Carri Smith CS.
Human Resources Manager
Valmont Newmark
1950 Industrial Blvd.
Jasper, TN 37347
(423) 942-9888 ext. 2412

JASPER MATERIALS

150 Hickman Rd
Jasper, TN.37347
423-942-4090

Kay Light
Director, Career & Technical Education
Marion County Schools
07/21/2016

Dear, Ms. Light,

Jasper Materials Inc. is happy to offer support to the (AMSIP) program. We are consistently engaged in the never ending struggle to fill various skilled labor positions within our organization. We also realize that as the industry continues its upward growth trend, that this will be an even more difficult task. A program such as AMSIP, is a great opportunity to alleviate the burden of recruiting the skilled labor needed in manufacturing.

Jasper Materials Inc. is committing to participating in the student recruitment events in the Spring of 2017 and will commit to providing one (1) internship. The internship would be paid at a rate of $10.00/hr and consist of a minimum of 25 hours/week. We also commit to providing the additional benefit of $520 of academic credit scholarship, upon completion of the internship.

Jasper Materials Inc. as always is glad to support both our community schools, Marion County Schools and Chattanooga State. Please feel free to contact us for future opportunities to work together toward this goal.

Sincerely,

Neal Nelson
Plant Manager
Jasper Materials Inc.
423-942-4090

Attachment Four

Project Timeline

Project Timeline and Major Inputs, Outputs, and Benchmarks

Year	Project Timeline and Major Inputs: "0" indicates completion												
1.0	**Year 1 Activities 2016--2017**	Sept	2	3	4	Jan	6	7	8	9	10	11	Aug
1.1	Equipment Procurement	X	X	X	X	0	0	0	0	0	0	0	0
1.2	Post Jobs for 2 staff positions/interviews		X	X	X	0	0	0	0	0	0	0	0
1.3	Whitwell H.S. electrical upgrade	X	X	X	0	0	0	0	0	0	0	0	0
1.4	Marketing Procurement	X	X	X	0	0	0	0	0	0	0	0	0
1.5	Staff start date					X	0	0	0	0	0	0	0
1.6	Review and modify as needed the articulation agreements and equivalency models	X	X	X	X	0	0	0	0	0	0	0	0
1.7	Outreach (on-going) using printed materials; staff to begin outreach activities in January 2017			X	X	X	X	X	X	X	X	X	X
1.8	Install equipment			X	X	0	0	0	0	0	0	0	0
1.9	AMSIP Team Meetings	X			X			X			X		X
1.10	Identify cohort headcounts in Hamilton, Marion and Bledsoe Counties (8 high schools); student level data to be reported as requested				X	X	0	0	0	0	0	X	0
1.11	Track dual enrollment/dual credit (on-going)					X	X	X	X	X	X	X	X
1.12	Data Collection (on-going)	X	X	X	X	X	X	X	X	X	X	X	X
1.13	Quarterly tracking/reports				X			X				X	
1.14	Students to self-identify and declare intentions to enroll in the AM							X	X	0	0	0	0

Project Timeline and Major Inputs, Outputs, and Benchmarks

	Academy and internship program											
	Year 1 Activities cont.			3	4	5	6	7	8	9	10	11	Aug
1.14	Advanced Manufacturing Academy (recurring)										X	0	0
1.15	Begin 6-week internships (recurring—post-academy)										X		
1.16	Junior AM Academy (Saturday event)										X		
1.17	24 Teacher Externships											X	
1.18	Monthly invoice review/tracking		X	X	X	X	X	X	X	X	X	X	X
2.0	**Year 2 Activities 2017-2018**	Sep	14	15	16	Jan	18	19	20	21	22	23	Aug
2.1	Student data	X	X	X	X	X	X	X	X	X	X	X	X
2.2	AMSIP Team Meetings (as scheduled OR as needed)	X						X					X
2.3	Marketing/Outreach	X	X	X	X	X	X	X	X	X	X	X	X
2.4	Dual credit or enrollment cont.	X	X	X	X	X	X	X	X	X	X	X	X
2.5	Data collection	X	X	X	X	X	X	X	X	X	X	X	X
2.6	Tracking/reports	X			X			X			X		X
2.7	Students to self-identify and declare intentions to enroll in the Advanced Manufacturing Academy and internship program							X	X	0	0	0	0
2.8	Advanced Manufacturing Academy (one week)										X		
2.9	Begin 6-week internships (recurring—post-academy)										X		
2.10	Junior AM Academy (Saturday event)										X		
2.11	24 Teacher Externships											X	
2.12	Monthly invoice review/tracking	X	X	X	X	X	X	X	X	X	X	X	X
3.0	**Year 2-3 Activities 2018-2019**	Sep	26	27	28	Jan	30	31	32	33	Jun		
3.1	Student data	X	X	X	X	X	X	X	X	X	X		
3.2	AMSIP Team				X								

Project Timeline and Major Inputs, Outputs, and Benchmarks

	Meetings (as needed)												
	Year 2-3 cont.	Sep	26	27	28	29	30	31	32	33	Jun		
3.3	Marketing/Outreach	X	X	X	X								
3.4	Dual credit or enrollment cont.	X	X	X	X	X	X	X	X	X			
3.5	Data collection	X	X	X	X	X	X	X					
3.6	Monthly invoice review/tracking	X	X	X	X	X	X	X	X	X	X		
3.7	Grand closeout										X		
3.8	LEAP-funded Outreach Coordinator end date								X				
3.9	LEAP-funded Program Manager end date (assist grant close out)										X		
3.10	AM Academy, Junior AM Academy, Internship Program to be supported by industry partners; Teacher Externship Program may continue if industry partners find the program to have positively impacted AM career interest and increased CTE enrollment in AM pathways										X	X	

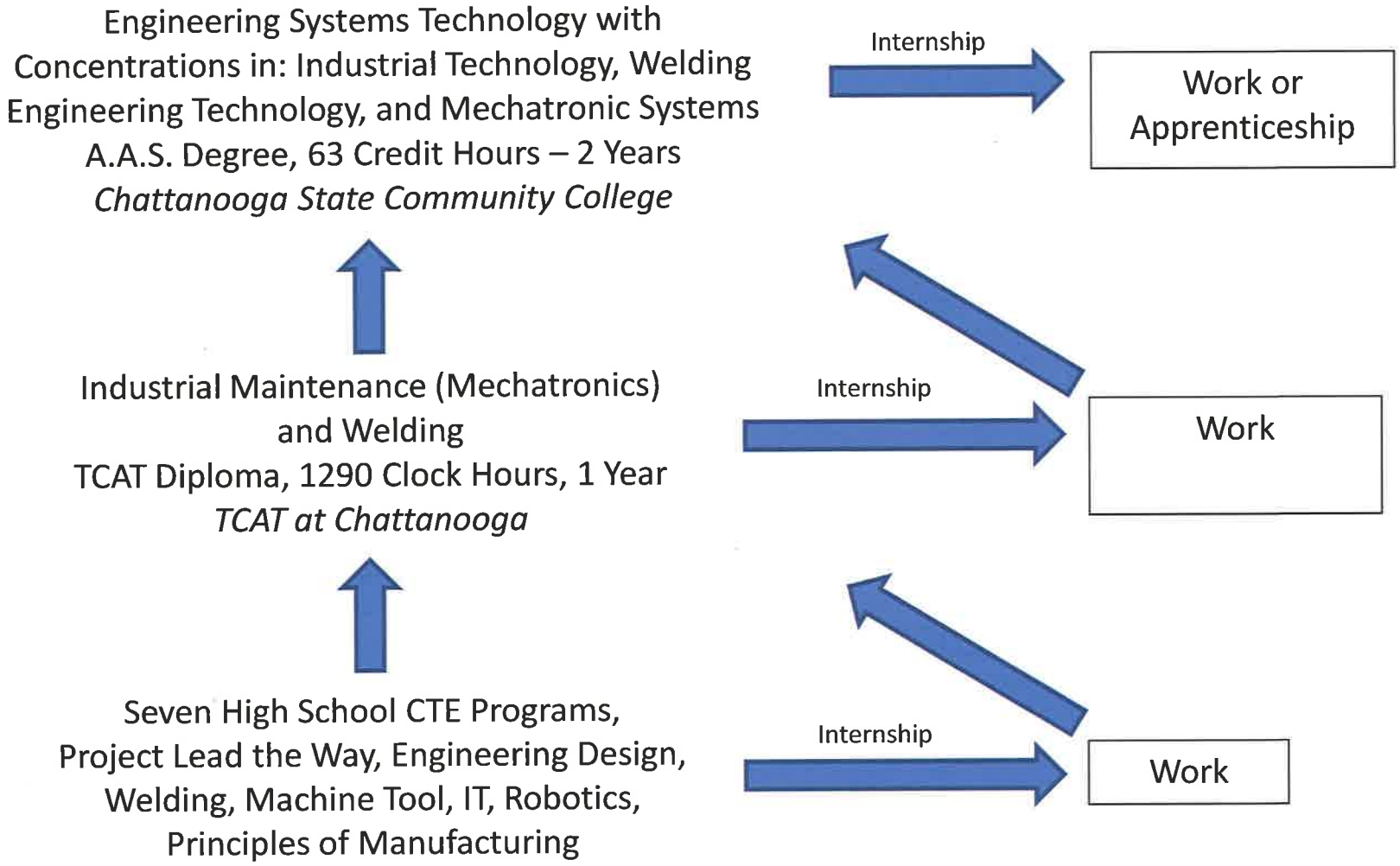
Note: If awarded and as stated in the narrative, the AMSIP team will request a grant period extension in order to complete an entire semester in spring 2019.

Attachment Five

Education and Career Pathways

AMSIP Educational and Career Pathways

Drive to 55

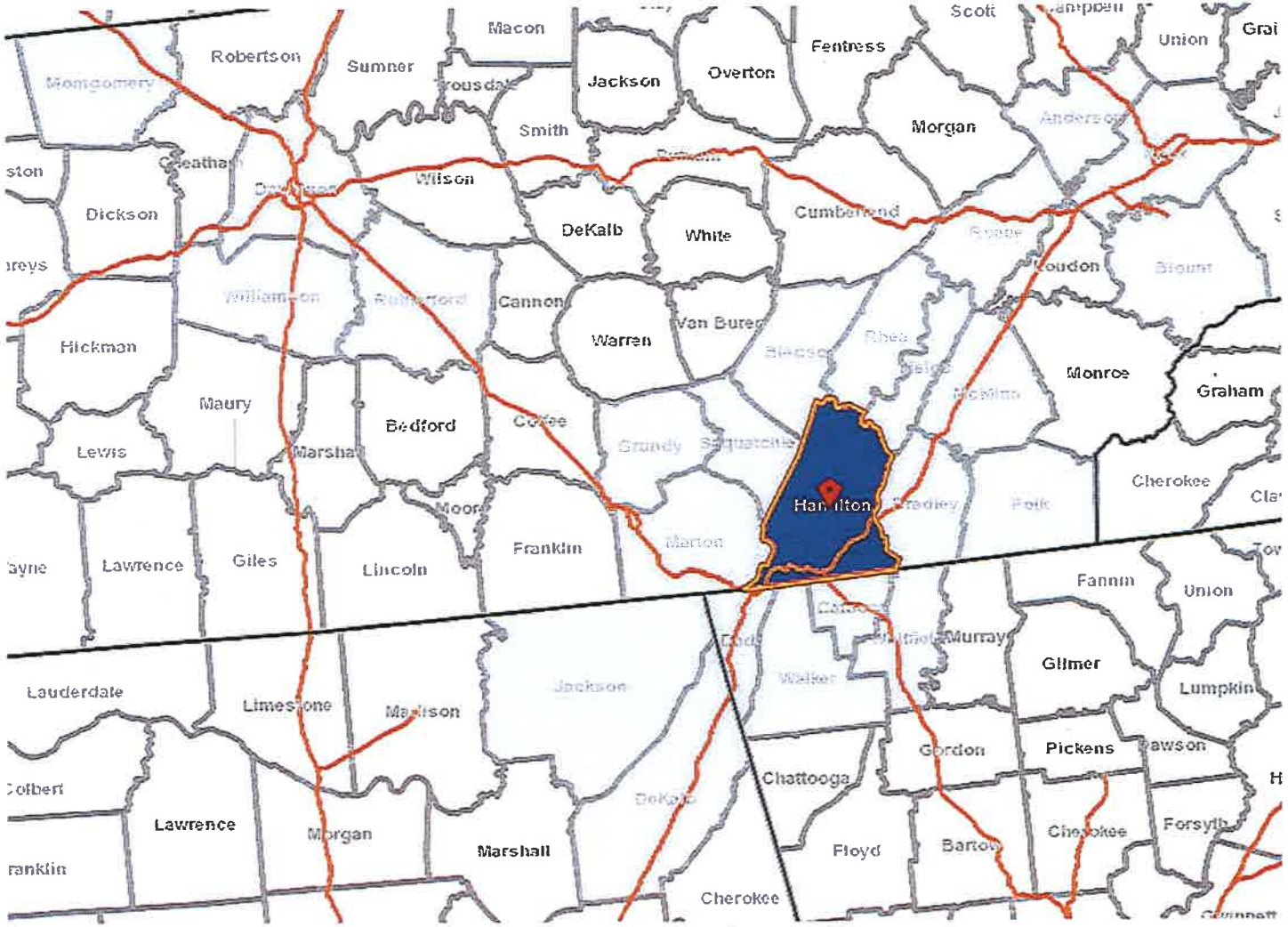


Attachment Six

Commute Patterns

CHATTANOOGA TENNESSEE

Hamilton County Labor Draw – Top 25 Counties (2011 Inflow)



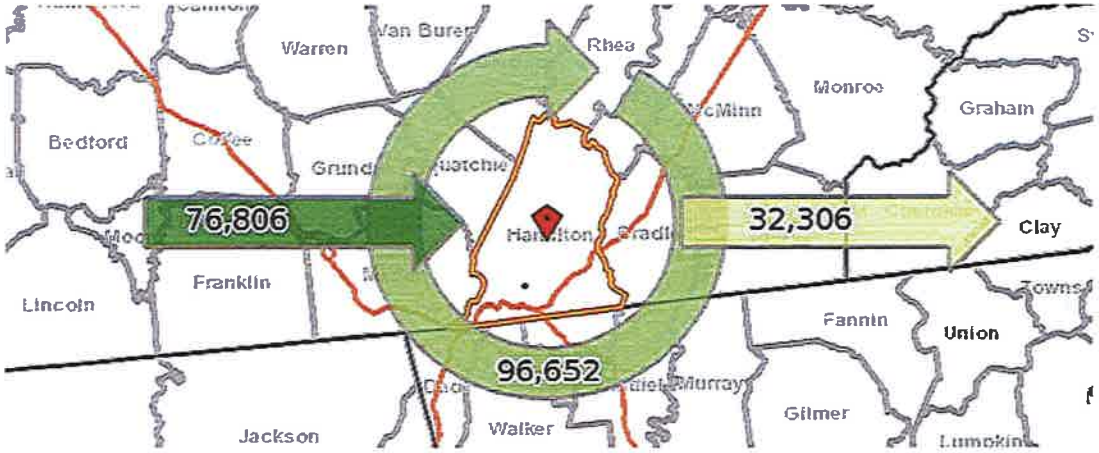
Hamilton County **Labor Draw Counties**

COMPILED BY: **Chattanooga Area Chamber of Commerce** Business Information Center, Economic Development Department

CHATTANOOGA TENNESSEE

Hamilton County Labor Draw – Top 25 Counties (2011 Inflow)

County	Inflow to Hamilton County	% Share	County	Inflow to Hamilton County	% Share	County	Inflow to Hamilton County	% Share
Hamilton County, TN	96,652	55.7	McMinn County, TN	1,591	0.9	Anderson County, TN	745	0.4
Catoosa County, GA	10,336	6.0	Rutherford County, TN	1,416	0.8	Blount County, TN	719	0.4
Bradley County, TN	7,812	4.5	Whitfield County, GA	1,414	0.8	Meigs County, TN	718	0.4
Walker County, GA	7,724	4.5	Shelby County, TN	1,280	0.7	Montgomery County, TN	685	0.4
Marion County, TN	3,534	2.0	Grundy County, TN	1,164	0.7	Roane County, TN	674	0.4
Davidson County, TN	3,206	1.8	Polk County, TN	1,115	0.6	All Other Locations	20,061	11.6
Knox County, TN	2,728	1.6	Jackson County, AL	1,027	0.6	**TOTAL**	**173,458**	100.0
Dade County, GA	2,377	1.4	Williamson County, TN	966	0.6			
Sequatchie County, TN	2,201	1.3	DeKalb County, AL	867	0.5			
Rhea County, TN	1,660	1.0	Bledsoe County, TN	786	0.5			



	Count	% Share
Employed in Hamilton County	173,458	100.0
Employed in Hamilton County but living outside	76,806	44.3
Employed and Living in Hamilton County	96,652	55.7
Living in Hamilton County	128,958	100.0
Living in Hamilton County but employed outside	32,306	25.1
Living and Employed in Hamilton County	96,652	74.9

COMPILED BY: **Chattanooga Area Chamber of Commerce** Business Information Center, Economic Development Department

Attachment Seven

Advanced Manufacturing Academy

Junior Academy

Internships

Attachment Seven

Advanced Manufacturing Academy Activities

- **Occurs on ChSCC campus; 9 AM – 3 PM; Mon-Fri**
- **Industry partner presentations**
- **Soft skills**
- **STEM activities**
- **Workplace safety**
- **Identify interns**
- **Students prepare resumes in-class**
- **Industry partners observe students as part of interview**
- **Last day or last two days: industry partners interview students for internships**
- **COMPASS assessment for college entry**
- **Academy to serve as recruitment event for industry**
- **Future Academies to be sponsored by industry partners**
- **Provide morning snacks, lunches and t-shirts for participants**

Junior Advanced Manufacturing Academy

- **Saturday, one-day event, 9 AM to 1:00 PM following the one-week Academy**
- **Offered to students in grades 7 – 10**
- **Serves as a pipeline to recruit new students into the CTE program**
- **Expose students to STEM (e.g. mechatronics)**
- **Provide snacks and lunch**

Internship Program

- **Wages, salary, stipend**
- **Scholarship of approximate $518 to pay for academic credit as intern**
- **Six-week internship**
- **A minimum of 25 hours per week**
- **Next possible phases: Apprenticeship, co-op or full-time student postsecondary**

Attachment Eight

VW Academy's Mechatronics Akademie

CLASSES

Combination of high school courses and college courses:

Junior-year classes

- Environmental Science (high school only)
- Mechatronics I (high school only)
- Algebra II (high school only)
- English 11 (high school only)
- Welding Principles (college)
- AutoCAD (college)
- United States History (college)
- College Success in Engineering Technology (college)
- Mathematics for Engineering Technology (college)
- Industrial Safety (college)

Senior-year classes

- Mechatronics II (high school only)
- Electrical Fundamentals (college)
- Pre-Calculus (college)
- English Composition I (college)
- Microeconomics (college)
- American Government (college)
- Concepts of Physics (college)
- CATIA (college)
- Fluid Power (college)
- Communications in Engineering Technology (college)

GET IN TOUCH

Ralph.gwaltney@chatttanoogastate.edu

423-582-3061

7469 Volkswagen Drive
Chattanooga, TN 37416

PRESENTED BY:

IN PARTNERSHIP WITH VOLKSWAGEN CHATTANOOGA

MECHATRONICS AKADEMIE

A fast track for high school students to a career in mechatronics

Attachment Nine

AMSIP Program Activities that Address the Need

Attachment Nine
AMSIP Program Activities that Address the Need

Need	Activities to Address Need
Address the weak AM labor supply pipeline and contribute to the goals of Drive to 55 which will result in an increase in regional postsecondary educational credentials at ChSCC and TCAT Chattanooga	-Enhance programs of study in Hamilton County (East Hamilton, Sequoyah, and Tyner) and Bledsoe County High Schools) and implement new (Marion County Whitwell High School and Hamilton County Central High School) focused on the regional Pathways to Prosperity initiatives with dual enrollments and dual credit courses in high schools located in Hamilton, Marion, and Bledsoe Counties. Increase the alignment with education to industry needs and reevaluate frequently through constant communication. Hold AM Academy and Junior Academy events, in part, to establish a recruitment platform for industry partners. Industry partners to expand and continue to provide work-based learning opportunities via internships
Meet manufacturers' current and future workforce skills needs and address training gaps especially relating to new technologies such as process automation	- Focus training on mechatronics, industrial maintenance, machining and welding as selected by regional manufacturers; - Purchase/install needed equipment -Annual AM Academies
Address the negative perceptions of AM careers and workplace environment	- Significantly enhance AM Pathways marketing and outreach to educate middle/high school students, parents and counselors/teachers on 21st century workplace conditions via 2 teachers' paid Externship Program, two annual CTE student essay contests at all seven high schools on AM career pathways (industry partners present awards to winning essays), videos of AM facilities and training programs, Success Coaches (LEAP-funded Program Manager and Outreach Coordinator), bill boards, industry tours, career fairs,

Attachment Ten

Higher Education Commitment Letter

CHATTANOOGA STATE
COMMUNITY COLLEGE

Office of the President

4501 Amnicola Highway | Chattanooga, TN 37406-1097 | (423) 697-4400 | www.chattanoogastate.edu

July 18, 2016

Stephen Dunn
Regional Project Director
Southeast Tennessee Development District
PO Box 4757
Chattanooga, TN 37405-0757

Dear Stephen,

On behalf of Chattanooga State Community College (ChSCC), I am pleased to offer this letter of partnership for the Advanced Manufacturing Skills and Internship Program (AMSIP) proposed under Tennessee's Labor Education Alignment Plan (LEAP). We are excited to partner with the Southeast Tennessee Development District, the Hamilton County Department of Education, Marion County Department of Education, Bledsoe County Department of Education, and regional employers.

As an AMSIP partner, Chattanooga State will serve as fiscal agent, hire and supervise two staff members, provide office space for staff, provide space for the Advanced Manufacturing Academy, ensure program availability for Marion County and Bledsoe County students at the Marion County campus, and offer support services available to all ChSCC students including tutoring, advising, and student activities.

We appreciate the opportunity to work with your agency and with our communities as we endeavor to improve the regional workforce in advanced manufacturing.

Sincerely,

Flora Tydings

Dr. Flora Tydings, President
Chattanooga State Community College

Attachment Eleven

Chattanooga State's Current List of Internships, Co-ops and Apprenticeships

Employer	Title
BASF Corp	Internship
Boeing	Internship
Branch Technology	Internship
DENSO Manufacturing	Co-op
Edwin Bohr Electronics, Inc.	Internship
Feetz	Internship
Gestamp	Apprenticeship
Hutton	Internship
Invista	Co-op
James H. Wright Construction	Internship
Kemira	Co-op
Lake Winnepesaukah Amusement Park	Internship
Lock Joint Tube (LJT) of Tennessee, LLC	Internship
MRO Manufacturing Repair & Overstock, Inc.	Internship
Plastic Omnium	Apprenticeship
Pointe General Contractors	Internship
ResourceMFG/ProLogistix	Internship
Richmar	Internship
Riverside Development	Internship
RMJ Tactical, LLC	Internship
Tennessee Rand	Co-op
Tim Payne Painting	Internship
Unum	Internship
Valley Machine & Welding Co., Inc.	Internship
Vital Inspections Professionals, Inc.	Internship
Volkert, Inc.	Internship
Volkswagen	Apprenticeship
Volkswagen	Internship
Wacker	Apprenticeship
Whirlpool	Apprenticeship
Wright Brothers Construction Company Inc.	Apprenticeship
Xpress Global Systems	Internship
Yanfeng Automotive Interiors	Intern/Co-op